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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/595,340	04/11/2006	Tim Nielsen	PHDE030350US	7860

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CLEVELAND, OH 44143

EXAMINER

TANINGCO, ALEXANDER H

ART UNIT	PAPER NUMBER
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2882

MAIL DATE	DELIVERY MODE
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12/13/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.		Applicant(s)	
	10/595,340		NIELSEN ET AL.	
	Examiner		Art Unit	
	Alexander H. Taningco		2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>04/11/2006</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Foreign Priority

Acknowledgement is made of applicant's claim for foreign priority under 35 U.S.C. 19(a)-(c). Conditions were met with the submission of a certified copy of application 03103790.6, filed on 04/11/2006 which has been placed of record in the file.

Information Disclosure Statement

Receipt of the Information Disclosure Statement (IDS) with copies of the reference cited therein, was received on 04/11/2006. An initialized copy of the IDS is enclosed with this office action.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With regards to dependent claim 2, the examiner is unclear of the phrase "mutual influence" as claimed and throughout the application. The specification fails to specifically define the phrase "mutual influence". The examiner requests the applicant

to provide additional information. For purpose of examination, the examiner will interpret the phrase as noise.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sabbarao et al. (Performance of iterative tomographic algorithms applied to non-destructive evaluation with limited data) in view of Andersen et al. (Simultaneous Algebraic Reconstruction Technique (SART): A Superior Implementation of the ART Algorithm).

With regards to claims 1, 8, and 9, Subbarao et al. disclose a method comprising: (a) determining projection data from estimated data for a plurality of projections (Abs. Lines 4-6; page 359 Col. 2 Lines 9-11). (b) determining a difference between the estimated data and measured data (Abs. Lines 7-9); performing back-projection (page 360 Col. 2 Line 35). Sabbarao et al. fail to explicitly teach a method further comprising: (d) performing a filtering of the difference resulting in a filtered difference; and (e) performing a back-projection by updating the estimated data by using the filtered difference. Andersen et al. teach a method comprising: (d) performing a filtering of the difference resulting in a filtered difference (page 89 Line 17- page 90

Line 8); and (e) performing a back-projection by updating the estimated data by using the filtered difference (page 87 note: Fig. 4a). It would have been obvious to one of ordinary skill in the art, at the time of invention to modify the invention of Subbarao et al. to include the features of Andersen et al. to reduce noise thus improving image quality as taught by Andersen et al. (Page 90 Lines 14-15).

With regards to claim 2, Subbarao et al. as modified above in view of Andersen et al. disclose a method wherein the filtering is performed such that a mutual influence of the plurality of projections is at least partly filtered out (Page 90 Lines 14-16).

With regards to claim 3, Subbarao et al. as modified above disclose a method wherein the method is based on the algebraic reconstruction technique (ART) (Page 361).

With regards to claim 4, Subbarao et al. as modified above disclose a method wherein at least one of steps (a),(b), (c) and (d) is performed simultaneously for at least two projections of the plurality of projections (page 362 Col. 1).

With regards to claim 7, Subbarao et al. as modified above disclose a method wherein the method is applied in computed tomography (Abs.).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Subbarao et al. and Andersen et al. as applied to claim 1 above, and further in view of Claus (US 6,987,829).

With regards to claim 5, Subbarao et al. as modified above disclose a method as recited above in claim 1. Subbarao et al. as modified above fail to explicitly teach a

method further comprising: wherein for determining the filtered difference, a product of a projection of a current angle and an accumulation of back-projections of preceding angles is subtracted from the difference. Claus teach a method comprising: wherein for determining the filtered difference, a product of a projection of a current angle and an accumulation of back-projections of preceding angles is subtracted from the difference (Col. 3 Lines 27-28), It would have been obvious to one of ordinary skill in the art, at the time of invention to modify the invention of Subbarao et al. to include the features of Claus to improve computationally efficient and flexible method for reconstruction as taught by Claus (Col. 1 Lines 37-39).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Subbarao et al. and Andersen et al. as applied to claim 1 above, and further in view of Gullberg et al. (US 4,633,398).

With regards to claim 6, Subbarao et al. as modified above disclose a method as recited above in claim 1. Subbarao et al. as modified above disclose a method comprising: each projection of the object is interpreted as a path integral of the light sensitive property of the object in the appropriate direction (Abs. Lines 4-6). Subbarao et al. as modified above fail to explicitly teach a method comprising: wherein the estimated data is an estimated image and wherein the difference is a difference image. Gullberg et al. teach a method comprising: wherein the estimated data is an estimated image and wherein the difference is a difference image (Col. 7 Lines 40-44). It would have been obvious to one of ordinary skill in the art, at the time of invention to modify

the invention of Subbarao et al. to include the features of Gullberg et al. to improve efficient diagnostic imaging as taught by Gullberg et al. (Abs.).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents are cited to further show:

Hsieh et al. (US 6,768,782) (378/8)

- Iterative method for ROI reconstruction
- Projection data is filtered before being backprojected
- Forward projections and the measured projections are used as a basis for updating the reconstruction image

Cheng et al. (US 5,909,476) (378/4)

- Iterative processes may be based upon the emission computerized tomography expectation maximization formula and/or algebraic reconstruction technique (ART)
- Discrepancies between measured and estimated projection data are computed as either ratio or normalized difference (ART-like iterative deblurring)
- To obtain updated image, these discrepancies are back projected

Gullberg et al. (US 4,633,398) (364/414)

- SIRT algorithms can project and back project various types of information based on the requirements
- Measured projection signals or the difference between the measured projection signals and assumed projection signals can be back projected

Yamada et al. (US 6,426,988)

(378/4)

- Estimated and measured projection data
- Comparison reference image deriving process for deriving or obtaining a comparison reference image by backprojecting a difference or a ratio between the estimated projection data and the measured projection data

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander H. Taningco whose telephone number is (571) 272-8048. The examiner can normally be reached on Mon-Fri 8:00-4:30 EST.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Alexander Taningco
Patent Examiner
Art Unit 2882
571.272.8048


Courtney Thomas
Primary Examiner